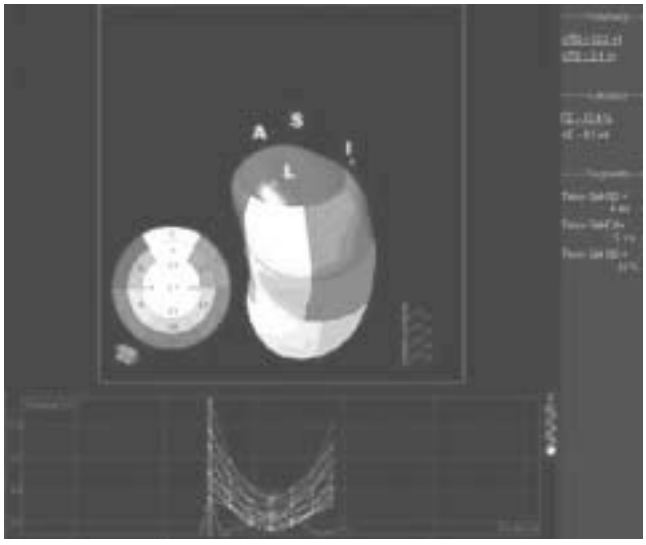
ference was 3.9 % +/- 8. No difference was found between Qlab and Tomtec observer variability. Nevertheless Tomtec inter Observer variability tends to be higher. The analysis time was shorter with QLAB (5 +/- 2 min vs. 6 +/- 3, $p < 0.05$).

Conclusion: 3DE is a feasible and adequate method for LV volume quantification in a normal pediatric population. Qlab analysis is faster, easier and inter-observer variability tends to be smaller. Further studies are needed to validate the accuracy of the method to calculate enlarged LV volumes in patients with congenital heart diseases.



3D reconstruction of the left ventricle

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Hakki's formula adapted for magnetic resonance imaging (MRI): a new method for assessing aortic stenosis severity?

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Objective: Hakki's formula (Gorlin formula simplified) can be used during cardiac catheterization to calculate stenotic cardiac valve areas and can also be adapted to magnetic resonance imaging (MRI) to measure stenotic cardiac valve areas. We aimed at evaluating whether this approach was reliable to determine the severity of aortic stenosis compared with the continuity equation by transthoracic echocardiography (TTE) and planimetry by MRI.

Material and methods: We included symptomatic patients with known aortic stenosis referred to our Cardiology Department for over one year. The aortic valve area (AVA) was estimated using Hakki's formula (MRI), planimetry (MRI) and the continuity equation (TTE). The agreement between measurement methods was analyzed using Bland and Altman methodology.

Results: We included 63 patients (mean age 72 ± 10 years, 35 (56%) males). Their mean AVA was 0.65 ± 0.25 cm^2 by continuity equation, 0.64 ± 0.16 cm^2 by planimetry and 0.64 ± 0.20 cm^2 by Hakki's formula. Mean differences (95% limits of agreement) were: 0.03 cm^2 (-0.32 to 0.25) for planimetry – continuity equation; 0.05 cm^2 (-0.40 to 0.29) for Hakki's formula – continuity equation; 0.02 cm2 (-0.20 to 0.25) for Hakki's formula – planimetry. Reproducibility inter and intra observers by Hakki's was excellent (intra class correlation coefficient 0.99 and 0.98 respectively).

Conclusion: The measurement of AVA by using Hakki's formula gives similar results as those obtained by continuity equation or planimetry. Hakki's formula has, however, the advantage of being easy to use, fast, reproducible and can be used regardless of the status of the valve (as opposed to planimetry). Hakki's formula could become the reference method to MRI to evaluate aortic stenosis. An assessment of a larger population is however necessary to validate this method.

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Usefulness of contrast echocardiography in Tako-Tsubo cardiomyopathy

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Background: Assessment of left ventricular (LV) dysfunction in Tako-Tsubo cardiomyopathy (TTC) is of importance. Biplane LV angiography well-characterizes this dysfunction, but is invasive. The aim of this prospective study was to assess the reliability of contract echocardiography in TTC.

Methods: We prospectively studied 50 women divided into 2 groups: 25 consecutive patients with TTC (group 1) and 25 patients with proved coronary artery disease (CAD) (group 2). Groups 2 was age- and sex-matched with group 1. All patients underwent coronary arteriography, biplane LV angiography, conventional transthoracic echocardiography and contrast transthoracic echocardiography less than 24 hours after the onset of symptoms. Gold standard for LV systolic function assessment was LV angiography.

Results: Mean age of patients with TTC was 73 ± 11 years. Mean angiographic LVEF was 38 ± 9%. LV segments were well-classified as having (or not) wall motion abnormalities in 70% and 88% by observer 1 using conventional and contrast echocardiography, respectively ($p < 0.0001$), and in 91% and 99% by observer 2 using conventional and contrast echocardiography, respectively ($p < 0.0001$). In patients with TTC, LVEF was 42 ± 11% assessed by conventional echocardiography (versus 38 ± 9% by LV angiography, $p < 0.0001$) and 38.2 ± 8.5% using contrast agent ($p = 0.42$, as compared to LV angiography). Sensitivities and specificities for the diagnosis of TTC by observer 1 were respectively 55% and 64% using conventional echo versus 88% and 84% using contrast agent. Sensitivities and specificities for observer 2 were respectively 72% and 88% using conventional echo versus 96% and 96% using contrast agent. Accuracy for the diagnosis of TTC was significantly improved using contrast echocardiography for both observers, whereas agreement between both observers was excellent using contrast agent (kappa = 0.85 versus 0.34 using conventional echocardiography).

Conclusion: We demonstrated that contrast echocardiography is an accurate imaging method for a non-invasive assessment of left ventricular systolic function in TTC.

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Towards a Noninvasive Assessment of Valve Biology: Echocardiographic Measures of Mitral Leaflet Distensibility

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Background: Changes in mitral valve (MV) elasticity or distensibility occur in disease and directly affect MV function, contributing to MV prolapse (MVP) or flail vs restricted coaptation of stiffer leaflets in functional mitral regurgitation (FMR) and MV stenosis (MS). Recent studies suggest MV distensibility may be modified to reduce MR, but distensibility has only been measured in excised MVs. Our aim was to test the feasibility of obtaining a noninvasive measure of MV distensibility in patients by measuring systolic change in anterior leaflet length (ALL) or anterior leaflet strain; and to test the hypothesis that these measures vary in diseases with known altered MV elasticity.

Methods: ALL was quantified in a long-axis view standardized by 3D echo in 80 patients: 20 each with normal hearts, MVP, FMR and MS. Disten-

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